

# NEBRASKA NATURAL RESOURCES COMMISSION

Water Sustainability Fund

Application for Funding

## Section A.

### ADMINISTRATIVE

PROJECT NAME: Groundwater Management for Mid-Summer Declines

#### *PRIMARY CONTACT INFORMATION*

Entity Name: Lower Platte North Natural Resources District (LPNNRD)

Contact Name: Larry Angle

Address: PO Box-126, 522 Commercial Park Road, Wahoo NE 68066

Phone: 402-443-4675

Email: langle@lpnnrd.org

Partners / Co-sponsors, if any: Producers in Special Quantity Subarea

1. Dollar amounts requested: (Grant, Loan, or Combination)

Grant amount requested. \$200,000

Loan amount requested. \$0.00

If Loan, how many years repayment period? N/A

If Loan, supply a complete year-by-year repayment schedule.  
N/A

2. Permits Needed - Attach copy for each obtained (N/A = not applicable)

Nebraska Game & Parks Commission  
(G&P) consultation on Threatened and  
Endangered Species and their Habitat

N/A ☐ Obtained: ~~YES~~ ☐ — ~~NO~~ ☐

Surface Water Right

N/A ☐ Obtained: ~~YES~~ ☐ — ~~NO~~ ☐

USACE (e.g., 404 Permit)

**N/A** ☐ Obtained: ~~YES~~ ☐ — ☐ **NO** ☐

Cultural Resources Evaluation

**N/A** ☐ Obtained: ~~YES~~ ☐ — ☐ **NO** ☐

Other (provide explanation below)

**N/A** ☐ Obtained: ~~YES~~ ☐ — ☐ **NO** ☐

[Click here to enter text.](#)

3. Are you applying for funding for a combined sewer over-flow project?

~~YES~~ ☐ **NO** ☐

If yes, do you have a Long Term Control Plan that is currently approved by the Nebraska Department of Environmental Quality?

YES ☐ NO ☐

If yes attach a copy to your application. [Click here to enter text.](#)

If yes what is the population served by your project? [Click here to enter text.](#)

If yes provide a demonstration of need. [Click here to enter text.](#)

If yes and you were approved for funding in the most recent funding cycle, then resubmit the above information updated annually but you need not complete the remainder of the application.

4. If you are or are representing an NRD, do you have an Integrated Management Plan in place, or have you initiated one?

~~N/A~~ ☐ **YES** ☐ **NO** ☐

5. Has this application previously been submitted for funding assistance from the Water Sustainability Fund and not been funded?

~~YES~~ ☐ **NO** ☐

If yes, have any changes been made to the application in comparison to the previously submitted application? [Click here to enter text.](#)

If yes, describe the changes that have been made since the last application.  
[Click here to enter text.](#)

No, I certify the application is a true and exact copy of the previously submitted and scored application. (Signature required) [Click here to enter text.](#)

6. Complete the following if your project has or will commence prior to next July 1<sup>st</sup>.

As of the date of submittal of this application, what is the Total Net Local Share of Expenses incurred for which you are asking cost share assistance from this fund? \$0.00.

Attach all substantiating documentation such as invoices, cancelled checks etc. along with an itemized statement for these expenses. N/A

Estimate the Total Net Local Share of Expenses and a description of each you will incur between the date of submittal of this application and next July 1<sup>st</sup> for which you are asking cost share assistance from this fund.  
\$246,000 of Total Net Local Share.

The project will begin in mid-January 2016 with water management and training classes put on by the Lower Platte North NRD for agricultural producers in the Platte-Colfax Special Quantity Subarea. Two additional classes will be held, one each in February and March. These classes will outline the problem area, define the water management strategy that will be used, and explain the LPNNRD cost share programs of soil moisture sensors, electronic readers, soil probes, and ET gauges to assist with irrigation water management. Estimated total cost to the LPNNRD before July 1, 2016 is estimated at \$25,500 (\$5,000 for the training classes and \$20,500 for 50% cost share for the soil moisture sensors, etc.).

Agricultural producers will purchase approximately 300 flow meters that must be installed by May 1, 2016. If this grant application is approved the estimated costs to these producers is \$200,000 for these meters. An additional expense of \$20,500 will be their 50% cost share expense with the LPNNRD to purchase and install soil moisture sensors, etc. This makes total producer expenses estimated at \$220,500.

## Section B.

### DNR DIRECTOR'S FINDINGS

Does your project include physical construction (defined as moving dirt, directing water, physically constructing something, or installing equipment)?

YES ☐ NO ☐

- 1(a). If yes (structural), submit a feasibility report ([to comply with Title 261, CH 2](#)) including engineering and technical data and the following information:

A discussion of the plan of development ([004.01 A](#));  
Click here to enter text.

A description of all field investigations made to substantiate the feasibility report ([004.01 B](#)); Click here to enter text.

Maps, drawings, charts, tables, etc., used as a basis for the feasibility report ([004.01 C](#)); Click here to enter text.

A description of any necessary water and land rights and pertinent water supply and water quality information, if appropriate ([004.01 D](#));  
Click here to enter text.

A discussion of each component of the final plan including, when applicable ([004.01 E](#));

Required geologic investigation ([004.01 E 1](#)); Click here to enter text.

Required hydrologic data ([004.01 E 2](#)); Click here to enter text.

Design criteria for final design including, but not limited to, soil mechanics, hydraulic, hydrologic, structural, embankments and foundation criteria ([004.01 E 3](#)). Click here to enter text.

- 1(b). If no (non-structural), submit data necessary to establish technical feasibility including, but not limited to the following ([004.02](#)):

A discussion of the plan of development ([004.02 A](#));

It was the drought of 2012 that caused the LPNNRD to look more closely at the geology in specific areas. In the fall of 2012 while measuring static water levels in our ground water energy level network, we noticed several areas that experienced steeper declines than others. It was really our network of continuous reading monitoring wells that revealed the true nature of multi-layered confined aquifers and the

problem of loss of water pressure in mid-summer. This was basically the summer months of July and August. In 2014 the LPNNRD established these as SQS areas and restricted further irrigation well development in these areas. This is now part of our current ground water management plan. The LPNNRD is working to incorporate this and other changes into our voluntary integrated water management plan currently under development.

A description of field or research investigations utilized to substantiate the project conception [\(004.02 B\)](#); [Click here to enter text.](#)

The LPNNRD is a member of the Eastern Nebraska Water Resources Assessment (ENWRA). In the fall of 2014 and the spring of 2015 ENWRA flew Airborne Electromagnetic Flights (AEM) over eastern Nebraska to study the geologic framework in more detail. Some of these flight lines went through our SQS areas to further characterize this glaciated portion of our State. ENWRA and LPNNRD are applying to the WSF for additional AEM flights specifically in our SQS areas.

In addition, staff started taking summer ground water energy level readings from irrigation wells inside and just outside these SQS for comparison. The summer of 2015 was relatively wet but inside the Platte-Colfax SQS areas a few irrigation wells showed a drop of 30 feet, while outside this SQS area the decline was generally around 5 to 8 feet.

A description of the necessary water and/or land rights, if applicable [\(004.02 C\)](#); [Click here to enter text.](#)

A discussion of the anticipated effects, if any, of the project upon the development and/or operation of existing or envisioned structural measures including a brief description of any such measure [\(004.02 D\)](#).  
[Click here to enter text.](#)

2. Provide evidence that there are no known means of accomplishing the same purpose or purposes more economically, by describing the next best alternative.

The next best alternative to flow meters, soil moisture probes, etc. is to establish a system of rotation so not all the irrigation wells are running at the same time. This would reduce demand and cause less of a drop in water pressure within the aquifer. Technology to send flow measurement data from irrigation wells over greater distances is not currently economical. One large expense is that additional cell towers or relay towers would have to be constructed. This could all change within the next 5

years as more towers are being built and technology and battery life improve. In either case, a flow meter would still be required.

3. Document all sources and report all costs and benefit data using current data, (commodity prices, recreation benefit prices, and wildlife prices as prescribed by the Director) using both dollar values and other units of measurement when appropriate (environmental, social, cultural, data improvement, etc.). The period of analysis for economic feasibility studies shall be fifty (50) years or with prior approval of the Director, up to one hundred (100) years [T261 CH 2 (005)].
  - Describe any relevant cost information including, but not limited to the engineering and inspection costs, capital construction costs, annual operation and maintenance costs, and replacement costs. Cost information shall also include the estimated construction period as well as the estimated project life (005.01). N/A
  - Only primary tangible benefits may be counted in providing the monetary benefit information and shall be displayed by year for the project life. In a multi-purpose project, estimate benefits for each purpose, by year, for the life of the project. Describe any intangible or secondary benefits separately. In a case where there is no generally accepted method for calculation of primary tangible benefits describe how the project will increase water sustainability, such that the economic feasibility of the project can be approved by the Director and the Commission (005.02). This project will reduce mid-summer declines and help sustain long term viability of these confined aquifers.
  - All benefit and cost data shall be presented in a table form to indicate the annual cash flow for the life of the proposal, not to exceed 100 years (005.03).

Funding Source	WSF	LPNNRD	Ag Producers in Platte- Colfax SQS	Total
Year One	\$200,000	\$25,500	\$220,500	\$446,000
Year Two	\$0	\$15,000	\$10,000	\$25,000
Year Three	\$0	\$15,000	\$10,000	\$25,000
Totals	\$200,000	\$55,500	\$240,500	\$496,000

- In the case of projects for which there is no generally accepted method for calculation of primary tangible benefits and if the project will increase water sustainability, the economic feasibility of such proposal shall be demonstrated by such method as the Director and the Commission deem appropriate (005.04). N/A

4. Provide evidence that sufficient funds are available to complete the proposal.

LPNNRD tax levy is 0.044601 and this is a significant concern of the District.

5. Provide evidence that sufficient annual revenue is available to repay the reimbursable costs and to cover OM&R (operate, maintain, and replace). N/A

6. If a loan is involved, provide sufficient documentation to prove that the loan can be repaid during the repayment life of the proposal. N/A

7. Describe how the plan of development minimizes impacts on the natural environment.

By managing for mid-summer declines this should extend the long term life of the aquifer

8. Explain how you are qualified, responsible and legally capable of carrying out the project for which you are seeking funds.

The Legislature and Governor established NRD's in part for ground water management and provided a taxing authority to fund their operations.

9. Explain how your project considers plans and programs of the state and resources development plans of the political subdivisions of the state.

This plan is sponsored by the LPNNRD and the NRD's role in management of ground water resources.

10. Are land rights necessary to complete your project?

YES ☐ NO ☐

If yes, provide a complete listing of all lands involved in the project.

[Click here to enter text.](#)

If yes, attach proof of ownership for each easements, rights-of-way and fee title currently held.

[Click here to enter text.](#)

If yes, provide assurance that you can hold or can acquire title to all lands not currently held.

[Click here to enter text.](#)

11. Identify how you possess all necessary authority to undertake or participate in the project. [Click here to enter text.](#)

The Legislature and Governor established NRD's in part for ground water management and this project is a direct offshoot of that granted authority.

12. Identify the probable environmental and ecological consequences that may result as the result of the project.

If this project to manage mid-summer declines is not carried out and additional irrigation wells are allowed to develop, then quite likely during the next severe drought in the Platte-Colfax SQS that many more wells will go dry and for likely a longer period of time. This would increase the economic hardship in the area for all types of well owners but especially on livestock and agricultural crops. The loss of a reliable water supply would also decrease land values and may result in some people moving out of the area.

## Section C.

### NRC SCORING

In the NRC's scoring process, points will be given to each project in ranking the projects, with the total number of points determining the final project ranking list.

The following 15 criteria constitute the items for which points will be assigned. Point assignments will be 0, 2, 4, or 6 for items 1 through 8; and 0, 1, 2, or 3 for items 9 through 15. Two additional points will be awarded to projects which address issues determined by the NRC to be the result of a federal mandate.

#### **Notes:**

- The responses to one criterion will not be considered in the scoring of other criteria. Repeat references as needed to support documentation in each criterion as appropriate. The 15 categories are specified by statute and will be used to create scoring matrixes which will ultimately determine which projects receive funding.
- There is a total of 69 possible points, plus two bonus points. The potential number of points awarded for each criteria are noted in parenthesis. Once points are assigned, they will be added to determine a final score. The scores will determine ranking.
- The Commission recommends providing the requested information and the requests are not intended to limit the information an applicant may provide. An applicant should include additional information that is believed will assist the Commission in understanding a proposal so that it can be awarded the points to which it is entitled.

Complete any of the following (15) criteria which apply to your project. Your response will be reviewed and scored by the NRC. Place an N/A (not applicable) in any that do not apply, an N/A will automatically be placed in any response fields left blank.

1. Remediates or mitigates threats to drinking water;
  - Describe the specific threats to drinking water the project will address.
  - Identify whose drinking water, how many people are affected, how will project remediate or mitigate.
  - Provide a history of issues and tried solutions.
  - Provide detail regarding long range impacts if issues are not resolved.

Specific threats to drinking water deal primary with inadequate water supply to rural domestic wells during the summer months. During the drought of 2012 the LPNNRD received numerous complaints of domestic and stock wells

going dry with the bulk of these coming from the now recognized areas of the Butler-Saunders and the Platte-Colfax Special Quantity Subareas (SQS). Lack of irrigation water was also reported for some irrigation wells in these same areas, which in a few cases resulted in crop loss.

It is estimated that at least 20 private domestic wells across both SQS areas were affected by these mid-summer declines. By producers monitoring their irrigation use and spreading that use over time so that not all high-capacity wells are running at the same time, it is hoped that large pressure drops in the aquifer can be avoided.

As far as history of issues, declines in both SQS areas were noted during the previous drought of 2000 to 2006, but the drought of 2012 was more severe with longer periods of higher temperatures, lower humidity, and less rainfall than any previous summer months. It was not truly recognized until the drought of 2012, what the full impact of multi-layered confined aquifers could have on water pressure and therefore supply. As a consequence the LPNNRD is not allowing any further new development of irrigation in these areas. The placement of flow meters on existing irrigation wells is to address any excessive ground water use during the summer, so all producers will have an equal share of the aquifer.

If long range impacts are not addressed and additional high capacity wells are allowed to be developed, it is predicted that portions of both SQS areas could run out of water pressure during dry summer months. This would affect domestic, stock, and irrigation wells and lead to environmental and economic impacts.

2. Meets the goals and objectives of an approved integrated management plan or ground water management plan;
  - Identify the specific plan that is being referenced including date, who issued it and whether it is an IMP or GW management plan.
  - Provide the history of work completed to achieve the goals of this plan.
  - List which goals and objectives of the management plan the project provides benefits for and how the project provides those benefits.

Following the drought of 2012, the LPNNRD recognized that some areas of our District experienced steeper declines than other areas, especially after comparing the fall ground water level readings. Data from continuous reading monitoring wells revealed the true nature of multi-layered confined aquifers and the problem of loss of water pressure restricted to basically the summer months of July and August. In 2014 the LPNNRD established these SQS and restricted further irrigation well development in these areas. This is part of our current ground water management plan but will be incorporated into our voluntary integrated water management plan currently under development.

3. Contributes to water sustainability goals by increasing aquifer recharge, reducing aquifer depletion, or increasing streamflow;

List the following information that is applicable:

- The location, area and amount of recharge;
- The location, area and amount that aquifer depletion will be reduced;
- The reach, amount and timing of increased streamflow. Describe how the project will meet these objectives and what the source of the water is;
- Provide a detailed listing of cross basin benefits, if any.

The location of the Butler-Saunders SQS area runs along the border of these two counties and basically from the towns of Bruno to Brainard. It is composed of 86 sections and contains 30 high capacity wells. The location of the Platte-Colfax SQS areas runs along the border of these two counties and is roughly south of Leigh to near Platte Center. It is composed of 132 sections and contains approximately 300 high capacity wells. It is the area of the Platte-Colfax SQS area that this application for a grant to the WSF is being made.

The Butler-Saunders SQS area can experience a drop of 80 to 100 feet in the potentiometric surface by late July into mid-August but after the irrigation season water pressure will build up so by October it is no longer a problem. The Platte-Colfax SQS area can see a drop of 50 to 60 feet in this same time period, but again by October the water pressure returns. By lowering the demand with better water management practices during these crucial months, all wells will benefit.

4. Contributes to multiple water supply goals, including, but not limited to, flood control, agricultural use, municipal and industrial uses, recreational benefits, wildlife habitat, conservation of water resources, and preservation of water resources;

- List the goals the project provides benefits.
- Describe how the project will provide these benefits
- Provide a long range forecast of the expected benefits this project could have versus continuing on current path.

The Butler-Saunders SQS area can experience a drop of 80 to 100 feet in the potentiometric surface by late July into mid-August but after the irrigation season water pressure will build up so by October it is no longer a problem. The Platte-Colfax SQS area can see a drop of 50 to 60 feet in this same time period, but again by October the water pressure returns. By lowering the demand with better water management practices during these crucial months, all wells will benefit.

5. Maximizes the beneficial use of Nebraska's water resources for the benefit of the state's residents;

- Describe how the project will maximize the increased beneficial use of Nebraska's water resources.
- Describe the beneficial uses that will be reduced, if any.
- Describe how the project provides a beneficial impact to the state's residents.

Better water management in these SQS areas will insure the long term sustainability of these confined aquifers for all the residents of these areas and sustain the economic viability, not to just this area, but to the four counties involved as well.

6. Is cost-effective;

- List the estimated construction costs, O/M costs, land and water acquisition costs, alternative options, value of benefits gained.
- Compare these costs to other methods of achieving the same benefits.
- List the costs of the project.
- Describe how it is a cost effective project or alternative.

The cost of the equipment such as flow meters, soil moisture sensors, etc. is much less than the cost to drill a new well. Of course a new well is contingent that a deeper aquifer of good quality water exists. In much of these SQS areas, that is questionable. Of course, if you run out of water then domestic well and stock well owners will have to truck in water at greater expense and the loss of crops will also be a much larger expense than this equipment.

7. Helps the state meet its obligations under interstate compacts, decrees, or other state contracts or agreements or federal law;

- Identify the interstate compact, decree, state contract or agreement or federal law.
- Describe how the project will help the state meet its obligations under compacts, decrees, state contracts or agreements or federal law.
- Describe current deficiencies and document how the project will reduce deficiencies.

N/A

8. Reduces threats to property damage or protects critical infrastructure that consists of the physical assets, systems, and networks vital to the state or the United States such that their incapacitation would have a debilitating effect on public security or public health and safety;

- Identify the property that the project is intended to reduce threats to.
- Describe and quantify reductions in threats to critical infrastructure provided by the project and how the infrastructure is vital to Nebraska or the United States.
- Identify the potential value of cost savings resulting from completion of the project.
- Describe the benefits for public security, public health and safety.

N/A

9. Improves water quality;

- Describe what quality issue(s) is/are to be improved.
- Describe and quantify how the project improves water quality, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- Describe other possible solutions to remedy this issue.
- Describe the history of the water quality issue including previous attempts to remedy the problem and the results obtained.

Better water management with the installation of flow meters, soil moisture sensors, etc. will reduce over-irrigation and therefore, reduce leaching of nitrate-nitrogen pass the root zone and into the aquifer. This will be a side benefit to this project.

10. Has utilized all available funding resources of the local jurisdiction to support the program, project, or activity;

- Identify the local jurisdiction that supports the project.
- List current property tax levy, valuations, or other sources of revenue for the sponsoring entity.
- List other funding sources for the project.

The current property tax levy of the LPNNRD is 0.044601. Other funding sources are agricultural producers as outlined in Section D #2 of this grant application.

11. Has a local jurisdiction with plans in place that support sustainable water use;

- List the local jurisdiction and identify specific plans being referenced that are in place to support sustainable water use.
- Provide the history of work completed to achieve the goals of these plans.
- List which goals and objectives this project will provide benefits for and how this project supports or contributes to those plans.

- Describe and quantify how the project supports sustainable water use, what is the target area, what is the population or acreage receiving benefits, what is the usage of the water: residential, industrial, agriculture or recreational.
- List all stakeholders involved in project.
- Identify who benefits from this project.

The local jurisdiction with water management rules is ourselves, the Lower Platte North NRD (LPNNRD). Part of the Platte-Colfax SQS area is also in the hydrologically connected area as identified by the Nebraska Department of Natural Resources (DNR) so there is some jurisdictional overlap in 16 of the total 132 sections. The LPNNRD identified this area as a potential higher level management area after the drought of 2012 and declared it a Special Quantity Subarea in 2014. This required a rule change which required public hearings and a major rewrite of our rules.

12. Addresses a statewide problem or issue;

- List the issues or problems addressed by the project and why they should be considered statewide.
- Describe how the project will address each issue and/or problem.
- Describe the total number of people and/or total number of acres that would receive benefits.
- Identify the benefit, to the state, this project would provide.

N/A

13. Contributes to the state's ability to leverage state dollars with local or federal government partners or other partners to maximize the use of its resources;

- List other funding sources or other partners, and the amount each will contribute, in a funding matrix.
- Describe how each source of funding is made available if the project is funded.
- Provide a copy or evidence of each commitment, for each separate source, of match dollars and funding partners.
- Describe how you will proceed if other funding sources do not come through.

N/A

14. Contributes to watershed health and function;

- Describe how the project will contribute to watershed health and function in detail and list all of the watersheds affected.

N/A

15. Uses objectives described in the annual report and plan of work for the state water planning and review process issued by the department.

- Identify the date of the Annual Report utilized.
- List any and all objectives of the Annual Report intended to be met by the project
- Explain how the project meets each objective.

The Lower Platte North has several different water management areas in our District based on both ground water quality and quantity. This information is provided to Department of Natural Resources (DNR) and the Department of Environmental Quality (DEQ) to assist in their State planning efforts..

We have two Phase Management areas that deal with water quality. These are the Phase 2 area near Bellwood in Butler County and the Phase 2 & 3 area in the Richland to Schuyler area of Colfax County.

We have established three different 'Water Development Areas' in our District based on the determination by DNR of the hydrologically connected areas of the Lower Platte River Basin. These are the non-hydrologically connected area where the LPNNRD restricts new irrigation development to ~400 acres per year. In the hydrologically connected area (as defined by DNR), the LPNNRD restricts new irrigation development to ~2,500 acres per year. In the restricted water development area, the LPNNRD does not allow new development. In this area we believe we have limited aquifer capacity and therefore to protect current users, we are not allowing any new development, except in special situations.

Another water quantity management area defined in our rules is called 'Level Water Management Areas'. If a subarea of our District reaches or exceeds its individually defined trigger level for three consecutive spring readings compared to the 1987 base year, then a Level Two or Three Water Management Area can be declared. This would require the installation of flow meters and a water allocation system would be established. The entire District is now in a Level One Management Area, but in 2014 we were near establishing some Level Two Management Areas but the spring readings of 2014 had recovered enough so no additional management area was necessary.

With the drought of 2012, the LPNNRD recognized the unique geology of multi-layer confined aquifers that could cause steep mid-summer declines. Water pressure returns in a few months so the problem no longer exists and therefore this would not fit within our definition of a 'Level Water Management Area'. So a new water quantity management method was studied, developed, and defined as a 'Special Quantity Subarea'. This is meant to address these mid-summer declines and it is the Platte-Colfax SQS, for which this grant request to the WSF is being made.

The LPNNRD is also in the process of developing a Voluntary Integrated Water Management Plan. Our Stakeholder meetings were concluded in June 2015 and the next step will be consulting with DNR and then move to the NRD Board for approval. After that public hearings will be held and then back to our Board for final approval. The plan is to conclude this plan by September of 2016.

All of this information is used by DNR as part of its annual basin water appropriation review.

16. Federal Mandate Bonus. If you believe that your project is designed to meet the requirements of a federal mandate which furthers the goals of the WSF, then:

- Describe the federal mandate.
- Provide documentary evidence of the federal mandate.
- Describe how the project meets the requirements of the federal mandate.
- Describe the relationship between the federal mandate and how the project furthers the goals of water sustainability.

N/A

## Section D.

### PROJECT DESCRIPTION

#### 1. Overview

In 1,000 characters or less, provide a brief description of your project including the nature and purpose of the project and objectives of the project.

Due to unique geologic conditions in portions of our District, ground water users in certain areas of our District are experiencing mid-summer declines of ground water energy levels that are leaving many wells with little water pressure or in some cases, no water at all. These unique geologic features exist along the border of Butler and Saunders Counties roughly between the towns of Bruno and Brainard, Nebraska and in the western portion of Colfax County through the central region of Platte County. These areas tend to have several multilayered confined aquifers and when there is great demand for irrigation, the water levels in these aquifers can quickly drop 60 to 80 feet in a very few weeks. Both areas have irrigated agriculture, but this is especially true in the central region of Platte County. In the Fall, the ground water levels in the wells return as the water pressure builds since the large demands are no longer being placed on the aquifer.

The drought of 2012 first made the NRD aware of the unique nature of some of the glaciated portions of our District. Information about the general location of confined multi-layered aquifers were known in our District, but it was not until the heavy water demand of 2012 that really made us aware of how they truly behave under stress conditions. The 'aquifer stress test of 2012' experienced mid-summer declines that were not noticed during the previous drought of 2000 to 2006. In 2013 the LPNNRD addressed these areas with the establishment of Special Quantity Subareas (SQS) and modification of our Ground Water Management Rules and Regulations in February of 2014.

The project objective is to reduce peak water demand from the aquifer during the summer months so all water users (both irrigation and domestic well users) will have sufficient water. High ground water demand primarily by irrigation users, caused a drop in aquifer water pressure which resulted in some wells running short of water or even going dry. Several complaints were received in our office that summer and this was one source used to help delineate the area. Another source to determine the geology was the registered well logs maintained by the Department of Natural Resources and the test hole database of University's Conservation and Survey Division. The third source was our own

ground water energy level measurements taken during the previous drought of 2000 to 2006. Additional sources included current ground water level measurements of area irrigation wells and summer hydrographs from our monitoring wells. The hydrographs from the monitoring wells are continuously recorded and this was the most useful information to document these mid-summer declines.

To achieve the project objective, the Lower Platte North NRD is proposing to install water flow meters on all high capacity wells in our District's Special Quantity Subareas ground water areas and place a three year rolling allocation on each of these wells. Flow meters are an inexpensive management tool that can have instant, as well as long term, water savings. The District is seeking a grant through the Nebraska Environmental Trust to provide cost-share assistance to producers for the purchase of water meters. The Lower Platte North NRD will provide education on proper installation of those flow meters and for other water management practices which will help them efficiently irrigate their fields. The District will provide cost-share on the installation of soil moisture sensors, require producers within the SQS areas to become certified operators to help reduce water use, annually report the amount pumped to the LPNNRD and to track other water management procedures required by the LPNNRD. The NRD will also explore a rotation of pumping to reduce peak ground water demand in mid-summer. At first this will be a voluntary system of rotation encouraging producers to work with their neighbors. This was done between producers in the central portion of Platte County in 2012.

To complement water efficiencies gained with the use of water meters, Lower Platte North NRD currently has a cost share program for watermark sensors and evapo-transpiration gauges. The University of Nebraska-Lincoln Extension has been a partner on this project since its inception in 2010. The Lower Platte North NRD provides a 50% cost share on the sensors, gauges, data collectors, and soil probes. When ordered, a member of UNL Extension will deliver the equipment and educate the producer on where to place the hardware in the field, how to read the numbers, and what those numbers mean in relation to their irrigation practices. It is the feeling of both the Lower Platte North NRD and the UNL Extension, that when all of these tools are being used properly a producer could save 1-2 inches of irrigation water per acre. This could equate to a 2 billion gallon savings across our two special groundwater quantity areas if the producers take advantage of this economic and environmental benefit.

This grant application is to address this second area of Platte and Colfax counties, since this area will become a SQS management area starting in January 2016.

## 2. Project Tasks and Timeline

Identify what activities will be conducted by the project. For multiyear projects please list what activities are to be completed each year.

The project implementation phase will be over a three year period with the majority of funding for flow meters to be spent in the first year. The potential for extending the initial one year funding into a second year depends on the logistics of getting all the meters in place in the first year. Each producer will have to apply for the cost share, and they will be approved on a case by case basis. The Lower Platte North NRD will continue with mandatory reporting and technical support well beyond the life of the grant.

### First Year (2016)

Funding Source	WSF	LPNNRD	Ag Producers in Platte- Colfax SQS	Total
Flow Meters (Est. 300 meters)	\$200,000		\$200,000	\$400,000
Management & Training Classes Budget Category		\$5,000		\$5,000
Soil Moisture Sensors, Electronic Readers for Sensors, Soil Probes, ET gauges		\$20,500	\$20,500	\$41,000
Totals	\$200,000	\$25,500	\$220,500	\$446,000

**Second (2017)**

<b>Funding Source</b>	<b>WSF</b>	<b>LPNNRD</b>	<b>Ag Producers in Platte- Colfax SQS</b>	<b>Total</b>
<b>Flow Meters (Est. 300 meters)</b>	\$0		\$0	\$0
<b>Management &amp; Training Classes Budget Category</b>		\$5,000		\$5,000
<b>Soil Moisture Sensors, Electronic Readers for Sensors, Soil Probes, ET gauges</b>		\$10,000	\$10,000	\$20,000
<b>Totals</b>	<b>\$0</b>	<b>\$15,000</b>	<b>\$10,000</b>	<b>\$25,000</b>

**Third Year (2018)**

<b>Funding Source</b>	<b>WSF</b>	<b>LPNNRD</b>	<b>Ag Producers in Platte- Colfax SQS</b>	<b>Total</b>
<b>Flow Meters (Est. 300 meters)</b>	\$0		\$0	\$0
<b>Management &amp; Training Classes Budget Category</b>		\$5,000		\$5,000
<b>Soil Moisture Sensors, Electronic Readers for Sensors, Soil Probes, ET gauges</b>		\$10,000	\$10,000	\$20,000
<b>Totals</b>	<b>\$0</b>	<b>\$15,000</b>	<b>\$10,000</b>	<b>\$25,000</b>

### 3. Partnerships

Identify the roles and responsibilities of agencies and groups involved in the proposed project regardless of whether each is an additional funding source. List any other sources of funding that have been approached for project support and that have officially turned you down. Attach the rejection letter.

The University of Nebraska-Lincoln Extension is a partner on this project with regard to soil moisture probes, etc. The Lower Platte North NRD provides a 50% cost share on the sensors, ET gauges, data collectors, and soil probes, while the agricultural producers pay the other 50%. After the equipment is ordered and delivered, personnel from UNL Extension will educate the producer on where to place the hardware in the field, how to read the numbers, and what those numbers mean in relation to their irrigation practices. It is estimated that 1-2 inches of irrigation water could be saved per acre on an annual basis, if all of these tools are used. UNL Extension is not a funding source for this project

The Lower Platte North NRD is a funding source for the training classes (100%) on water management and 50% cost share for the soil moisture sensors, ET gauges, data collectors, and soil probes.

The agricultural producers are responsible for 50% of the cost share for the irrigation well flow meters and 50% of the cost share for the soil sensors, etc.

In 2014 the LPNNRD applied to the Nebraska Environmental Trust with a similar grant request that did not rank high enough to be awarded funding. Rejection letter was not saved.

### 4. Other Sources of Funding

Identify the costs of the entire project, what costs each other source of funding will be applied to, and whether each of these other sources of funding is confirmed. If not, please identify those entities and list the date when confirmation is expected. Explain how you will implement the project if these sources are not obtained.

The funding sources for Lower Platte North NRD and from the agricultural producers in the Platte-Colfax SQS area are confirmed. If funding from the Water Sustainability Fund is not confirmed, then the agricultural producers in this SQS area will have to pay 100% for the required flow meters.

The table below represents the total project cost over a three year period.

**Entire Cost for Project (2016 – 2018)**

<b>Funding Source</b>	<b>WSF</b>	<b>LPNNRD</b>	<b>Ag Producers in Platte- Colfax SQS</b>	<b>Total</b>
<b>Flow Meters (Est. 300 meters)</b>	\$200,000		\$200,000	\$400,000
<b>Management &amp; Training Classes Budget Category</b>		\$15,000		\$15,000
<b>Soil Moisture Sensors, Electronic Readers for Sensors, Soil Probes, ET gauges</b>		\$40,500	\$40,500	\$81,000
<b>Totals</b>	<b>\$200,000</b>	<b>\$55,500</b>	<b>\$240,500</b>	<b>\$496,000</b>

**5. Support/Opposition**

Discuss both support and opposition to the project, including the group or interest each represents.

Both support and opposition to this change in water management comes from the agricultural producers in this SQS of Platte and Colfax counties. Some producers have themselves experienced a drop in water pressure that has affected all types of wells and realize that something must be done to sustain a long term supply during the summer months. Other producers have not experienced these problems and don't believe additional controls are necessary. The LPNNRD has held several public hearings in the area explaining the unique geology, multi-layered confined aquifers, and mid-summer declines observed in our monitoring wells to justify the need for better ground water management.

The LPNNRD is in the process of developing a voluntary integrated water management plan for our entire district, which should take effect in 2016.